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Surgical Management of Horn Squamous Cell Carcinoma in a Cow

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ABSTRACT

Horn squamous cell carcinoma is a common neoplasm in older, non-dehorned cattle. Swelling at the horn base, ulceration, foul-smelling discharge, and epistaxis are observed in effected animals. The present case describes the successful surgical management of squamous cell carcinoma of the horn in a cow. Tentative diagnosis made by physical and clinical examination and further conform by histopathological examination. Surgery performed in lateral recumbency under sedation and local anaesthesia. An elliptical skin incision was made at the base of the horn, to expose the corneal process. Finally the horn along with the diseased cornual process was excised using a chisel. This study demonstrates that surgical management of horn squamous cell carcinoma provide an excellent prognosis.

Keywords: Cattle, Squamous cell carcinoma, Cornual nerve block, Cornual amputation, Surgical management

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INTRODUCTION

Horn squamous cell carcinoma is a most commonly reported neoplasm in cattle, especially in older, non-dehorned cattle. The disease is more prevalent in the Indian subcontinent and is associated with chronic irritation, trauma, and infestation of the horn core by parasites (Radostits et al., 2010). The incidence of horn cancer has been recorded more frequently in cattle (80%) than in buffaloes (3%) (Shah et al., 2018). In cattle, horn concer is reported mainly in bullocks and less commonly in cows. Horn cancer is usually unilateral and is most often encountered in cattle 5–10 years of age (Sodhi and Sangwan, 2019). The disease is strongly associated with chronic irritation at the horn base (Sastry, 2020). Several predisposing factors such as horn dye, solar radiation, genetic predisposition, and sex hormones have also been reported to contribute to horn cancer (Sahoo et al., 2023).

Clinically, affected animals show swelling at the horn base, foul-smelling discharge, epistaxis, ulceration, and, in advanced stages, extension into the frontal sinus and adjacent bones (Blood et al., 2020). Surgical intervention remains the most effective and widely practiced treatment for horn squamous cell carcinoma in cattle. It ensures complete removal of neoplastic tissue and helps prevent recurrence (Fossum, 2013). The surgical procedure usually involves cornual amputation or partial frontal bone resection and is performed under local infiltration and cornual nerve block anesthesia. Surgery provides immediate improvement in clinical symptoms and gives the best prognosis when performed in the early stages and combined with proper postoperative management. The present study describes the successful surgical management of squamous cell carcinoma of the horn in a cow.

MATERIALS AND METHODS

A clinical case of horn cancer (Fig.1) was presented to the Department of Surgery, Bihar Veterinary College, Patna, with a history of bending and progressive swelling at the base of the horn, ulceration, and nasal bleeding from the affected side. The owner also reported partial anorexia for the past seven days.

Fig. 1: Clinical case of SCC

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Clinical examination revealed softening of the horn base and a necrotic mass around the cornual process. Physiological parameters such as rectal temperature, respiration, and heart rate were within the normal range (Table 1). Based on these findings, horn squamous cell carcinoma was tentatively diagnosed. Following confirmation, surgical management by horn amputation with removal of the cornual process was planned.

Fig. 1: Physiological parameters of clinical case during presentation

Serial No.	Parameters	Rate/ colour
1	Heart rate	70/minute
2	Respiratory rate	35/ minute
3	Rectal temperature	101.5oF
4	Colour of mucous membrane	Pink

Sedation was achieved using xylazine hydrochloride at 0.05 mg/kg body weight intramuscularly. A cornual nerve block was administered with 2% lignocaine hydrochloride at a depth of 4 cm into the temporal fossa, midway between the lateral canthus of the eye and the base of the horn, and supplemented with local infiltration around the horn base.

The animal was restrained in lateral recumbency with the affected horn on the upper side (Fig. 2) and the surgical site was prepared aseptically.

Fig. 2: Controlling in lateral recumbency

An elliptical skin incision was made at the base of the horn, and the horn along with the diseased cornual process was excised using a chisel (Fig. 3 & 4).

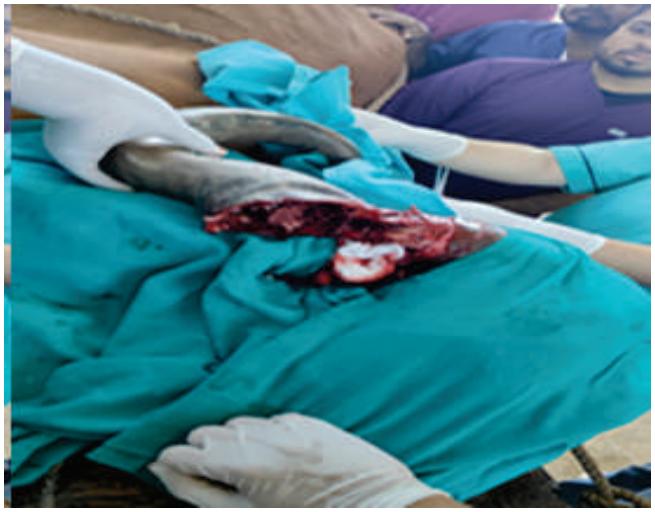

Fig. 3: Removal of Horn

Fig. 4: Removal of cornual process

The exposed frontal sinus cavity was curetted thoroughly to remove necrotic tissue and irrigated with diluted povidone-iodine solution. Hemostasis was achieved by ligating bleeding vessels and applying pressure. The skin was sutured with polyamide no. 1 using a simple interrupted pattern (Fig. 5).

Fig. 5: Skin suture & dressing

Postoperatively, the cow was treated with amoxicillin-sulbactam at 7 mg/kg body weight intramuscularly for seven days and meloxicam at 0.2 mg/kg body weight intramuscularly for three days, along with supportive therapy. The owner was advised to perform regular dressing and to monitor the animal for any signs of sinusitis or recurrence.

RESULTS AND DISCUSSION

The surgery was completed without intraoperative complications. Postoperatively, the animal resumed normal feeding within three days, and progressive improvement in its general condition was observed. The surgical wound showed satisfactory healing, and sutures were removed on the 10th postoperative day. Complete recovery was achieved within two weeks, with the cow regaining normal behaviour and activity. During the two-month follow-up period, no signs of recurrence, nasal bleeding, or sinus infection were observed. These finding indicating effective surgical management. Histological examination of the excised tissue revealed atypical epithelial cells with a high nuclear-to-cytoplasmic (N:C) ratio, coarsely clumped chromatin, and numerous mitotic figures. Concentric layers of keratinized epithelial pearls were also observed (Fig. 6). In addition, extravasated red blood cells (RBCs) and a few neutrophils were present within the tissue, findings highly suggestive of squamous cell carcinoma (SCC).

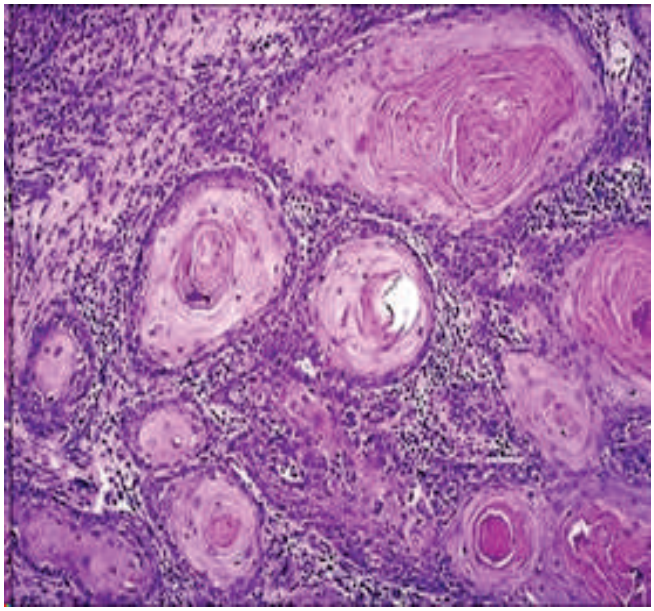

Fig. 6: Histopathological examination

Horn cancer is one of the most common malignancy observed in castrated bovines (Tyagi and Singh, 2019). It is a slow-growing but locally invasive neoplasm commonly reported in aged bullocks, particularly in regions where horn injury, chronic irritation, or exposure to sunlight predispose to carcinogenesis (Kumar et al., 2021). The present case in a cow, although less common, corroborates reports that chronic irritation at the horn base can also lead to malignant transformation. The present case demonstrated successful surgical management of horn squamous cell carcinoma in a cow, without intraoperative and postoperative complication. Similar results also reported in cattle by Kalaka et al. (2024). Horn was imputed by an elliptical skin incision under sedation & local anaesthesia, provided a smooth surgical procedure and an appropriate skin flap for suturing. Similar anaesthetic protocols have been described by Kumar et al. (2013), Reddy et al. (2017), Sodhi and Sangwan (2019) and Mahesh et al. (2024). Chemotherapy was not undertaken in this case due to the owner's reluctance and the age of the animal. However, Kumar et al. (2013) reported successful use of intravenous vincristine sulphate at 0.025 mg/kg, administered three times at weekly intervals.

Histo-pathological examination confirmed the diagnosis of SCC, consistent with earlier reports describing the tumor as an invasive epithelial malignancy originating from the cornual epithelium (Sodhi, 2019). The presence of atypical epithelial cells with a high nuclear-to-cytoplasmic ratio, coarse chromatin, and frequent mitotic figures indicated active cellular proliferation. The identification of keratin pearls, a characteristic histological hallmark, further supported the diagnosis. Inflammatory infiltrates and extravasated erythrocytes observed in this case, also described by Sahoo et al., (2023) in advanced case of horn cancer due to secondary infection and local tissue destruction. These findings suggest that clinical signs and gross appearance are strongly indicative for horn cancer, however histopathology remains the gold standard for the definitive diagnosis of horn cancer. Early diagnosis followed by complete surgical excision of the affected horn and cornual process alleviates clinical symptoms and provides the better prognosis. Recurrence rates of SCC remain minimal when the tumor is detected before extensive invasion into adjacent bony structures (Sastry, 2020).

CONCLUSION

Early diagnosis and surgical management of horn squamous cell carcinoma can provide an excellent prognosis and significantly improve the quality of life and productivity of affected animals. Horn squamous cell carcinoma can be surgically managed under local anaesthesia along with sedation in field condition.

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